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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/852,028	05/10/2001	Surender V. Brahmaroutu	219.39661X00	4632

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Rob D. Anderson
C/O BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN LLP
12400 Wilshire Boulevard
Seventh Floor
Los Angeles, CA 90025

EXAMINER

PHAN, TAM T

ART UNIT PAPER NUMBER

2144

DATE MAILED: 08/08/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/852,028

Applicant(s)

BRAHMAROUTU, SURENDER V.

Examiner

Tam (Jenny) Phan

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 06 June 2005.
2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-25 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 1-25 is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
10) ☒ The drawing(s) filed on 10 May 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____

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DETAILED ACTION

1. Amendment received on 06/06/2005 has been entered. Claims 1, 11, and 19 are currently amended.
2. Claims 1-25 are presented for examination.

Priority

3. No priority claims have been made.
4. The effective filing date for the subject matter defined in the pending claims in this application is 05/10/2001.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki (Patent Number 5,796,736) in view of Cheng (U.S. Patent Number 6,563,798).
7. Regarding claim 1, Suzuki disclosed a method for programming forwarding tables for switches for multipathing in a subnet of a switched fabric including at least a host system, a target system and switches each having one or more ports interconnected via links (Figures 11 and 14, Title, Abstract), said method comprising: determining all possible links between all ports on the subnet during topology discovery (Figures 11 and 14, Title, Abstract, column 1 lines 39-56, column 5 lines 35-45), creating an all port connectivity table which records all port-to-port connectivity information (Figures 11 and 14, column 8 line 64-column 9 line 17,

); and computing forwarding tables for respective switches on the subnet that allow usage of multiple paths between switch pairs based on the port-to-port connectivity information (Figures 11, 14, 16, and 20, column 9 lines 4-17, column 10 lines 22-29).

8. Suzuki taught the invention substantially as claimed. However, Suzuki did not expressly teach the steps of creating an all switch shortest paths table which records all the shortest paths between every switch pair on the subnet based the port-to-port connectivity information and computing forwarding tables for respective switches on the subnet that allow usage of multiple paths based on the shortest paths between every switch pair.

9. Suzuki suggested exploration of art and/or provided a reason to modify the method for programming forwarding tables with the shortest paths feature (Figures 11, column 1 lines 39-56, column 16 line 57-column 17 line 17).

10. Chen disclosed a method for dynamically create routing tables for switches for multipathing in a subnet of a switched fabric including at least a host system, a target system, and switches each having one or more ports interconnected via links () comprising: creating an all port connectivity table which records all port connectivity table [PNNI Topology Database] which records all port-to-port connectivity information (Figure 2 sign 22, Figure 3 sign 22, column 5 lines 45-623); creating an all switch shortest paths table which records all the shortest paths between every switch pair on the subnet based on the port-to-port connectivity information (Figure 2 sign 26, column 2 43-55, column 4 lines 15-25, column 6 lines 5-16); and computing forwarding tables for respective switches on the subnet that allow usage of multiple paths based on the port-to-port connectivity information and based on the

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shortest paths between every switch pair (Figures 2-3, column 6 lines 5-16, column 10 lines 36-58).

11. It would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify the method of Shah with the teachings of Chen to include the shortest paths feature in order to optimized designated traffic (Chen, column 3 lines 39-42) since shortest path table is constructed based on the optimization traffic metric (Chen, column 3 lines 26-32).

12. Regarding claim 2, Chen disclosed a method further comprising: downloading the forwarding tables to respective switches on the subnet that allow usage of multiple paths between switch pairs; and enabling respective switches on the subnet to route data packets from the host system to the target system via multiple paths through the switched fabric (column 3 line 56-column 4 line 4).

13. Regarding claim 3, Suzuki disclosed a method wherein each of said host system and said target system includes a channel adapter (CA) installed supporting one or more ports with each port having multiple local identifiers (LIDs) assigned thereto for multipathing (column 2 lines 3-6, column 5 lines 1-14, column 6 line 66-column 7 line 19).

14. Regarding claim 4, Suzuki disclosed a method wherein each port on the subnet supports a unique 16-bit LID and a LID Mask Control (LMC) which specifies the number of low order bits of the LID to mask when checking a received destination LID against the port's destination LID (Figure 7, column 2 lines 3-6, column 5 lines 1-14, column 6 line 66-column 7 line 19). LID features and LMC are well known in the network environment particularly in the InfiniBand network area.

15. Regarding claim 5, Suzuki and Chen disclosed a method wherein said forwarding tables are computed to ensure loop-less paths and allow ports to be addressed by multiple local identifiers (LIDs), and wherein said all-port connectivity and all-switch shortest paths tables are constantly updated reflecting any dynamic changes to the subnet topology (Suzuki, column 2 lines 3-6, column 5 lines 1-14, column 6 line 66-column 7 line 19; Chen, column 6 lines 17-26).

16. Regarding claim 6, Chen disclosed a method wherein said forwarding tables are computed based on the principle that only the shortest path between a given switch pair is guaranteed to overlap with other shortest paths that either originate from or destined to some intermediate port that exists on the shortest path between the original switch pair (column 3 lines 15-27, column 6 lines 6-16, column 9 lines 19-32).

17. Regarding claim 7, Chen disclosed a method wherein a forwarding table for a switch is computed by: determining a destination switch to which a destination port is directly connected, identifying all the links that exist between the destination switch and other switches in the subnet; sorting all the links by respective originating port number in an ascending order; picking an appropriate link and identifying the switch to which the link is connected at the other end; determining the best route between the switch identified and the switch for which the forwarding table is being constructed; and inputting associated outputport number at a designated location in the forwarding table (Title, Abstract, Figures 2-3, column 5 lines 45-62, column 6 lines 5-16, lines 27-47, column 9 lines 17-31, column 10 lines 11-24, lines 36-58).

18. Regarding claim 8, Chen disclosed a method wherein said shortest paths between every switch pair are computed utilizing an All Pair Shortest Paths (APSP) algorithm, and each shortest path from the source to the destination switch is represented by a <Port, Cost> duple in which port is the port number of the source switch where the path originates and cost is the path cost metric that is computed based on a hop count, a message transfer (MTU) size, a link speed, width and other port and link characteristics (column 3 line 60-column 4 line 4, column 4 lines 15-27, column 10 lines 11-23, lines 51-62).

19. Regarding claim 9, Chen disclosed a method wherein a forwarding table for a switch is computed by: determining a destination switch to which a destination port is directly connected, identifying all the links that exist between the destination switch and other switches in the subnet; sorting all the links by respective originating port number in an ascending order; picking an appropriate link and identifying the switch to which the link is connected at the other end; determining the best route between the switch identified and the switch for which the forwarding table is being constructed; and inputting associated output number at a designated location in the forwarding table (Title, Abstract, Figures 2-3, column 5 lines 45-62, column 6 lines 5-16, lines 27-47, column 9 lines 17-31, column 10 lines 11-24, lines 36-58).

20. Regarding claim 10, the claim is depended upon a rejected claim, therefore, is also rejected.

21. Regarding claims 11-18, the data network corresponds to the method of claims 1-8 and 10, and thus these claims are rejected using the same rationale.

22. Regarding claims 19-25, the data network corresponds to the method of claims 1-2 and 4-8, and thus these claims are rejected using the same rationale.

23. Since all the limitations of the claimed invention were disclosed by the combination of Shah and Chen, claims 1-25 are rejected.

Response to Arguments

24. Applicant's arguments with respect to the pending claims have been considered but are moot in view of the new ground(s) of rejection.

25. As the rejection reads, Examiner asserts that the combination of these teachings render the claimed invention obvious.

Conclusion

26. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Refer to the enclosed PTO-892 for details.

27. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tam (Jenny) Phan whose telephone number is (571) 272-3930. The examiner can normally be reached on M-F 9:00-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Wiley can be reached on (571) 272-3923. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-3900.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published

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applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

MARC D. THOMPSON
MARC THOMPSON
PRIMARY EXAMINER
571.272.3932

Tam T. Phan
July 28, 2005

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